



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, APRIL/MAY 2019

COURSE NO: EL 278

COURSE NAME: DIGITAL ELECTRONICS

CLASS: EL II

TIME: 3 HOURS

Name: _____ Index Number: _____

Answer all questions.

1. Using Boolean postulates show that

25 MARKS

(a)

(i) $\overline{\overline{X\bar{Y} + XYZ + X(Y + X\bar{Y})}} = 0$

(ii) $(A + B)(\bar{A} + C)(B + C) = AC + \bar{A}B$

(iii) Express $(A + B)(B + C)$ in its standard product of sums (POS) form.

(b) Convert

(i) $(26153.7460)_8 = (\quad)_2$

(ii) $(2C6B.F2)_{16} = (\quad)_2$

(iii) $(99880.56)_{10} = (\quad)_{BCD}$

(iv) Express the switching circuit shown in fig. 1 in binary notation

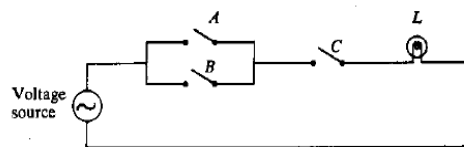


Fig. 1

(c) List the merits and demerits of digital system

2.

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(a) Name three applications of gray code

(b) Convert

(i) $(1110111)_2 = (?)_{Gray Code}$

(ii) $(11011)_{Gray Code} = (?)_2$

(c)

(i) What is a parity bit?

(ii) Write the hamming (7, 4) code for 0000 using

1. even parity
 2. odd parity
- (iii) If the 7-bit hamming code word received by a receiver is 1011011. Assuming even parity, state whether the received code word is correct or wrong. If wrong, locate the bit having error.

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3. By means of Karnaugh map simplify the Boolean function

$$F(A, B, C, D) = \sum m(0,1,2,5,8,9,10) \text{ in}$$

- (a)
- (i) sum of products
 - (ii) product of sum
 - (iii) draw the logic circuit of the minimised equation that will ensue in (i) and (ii).
- (b) Implement the Boolean function $F(A, B, C, D) = \sum m(0,1,3,4,8,9,15)$ with an 8 x 1 multiplexer using A as one of the inputs.

4. (a) Define the following:

25 MARKS

- (i) Combinational circuit
 - (ii) Sequential circuit
 - (iii) Flip-Flop
 - (iv) latch
- (b)
- (i) Draw the MOD-16 asynchronous counter circuit.
 - (ii) Draw the waveform of the circuit
- (c) Distinguish between ROM and RAM

Examiner: E. Addo